

Notice of Allowability

Application No.

10/661,530

Examiner

Livius R. Cazan

Applicant(s)

IMAFUJI ET AL.

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the telephone interview on 03/28/2006 and the follow-up on 3/29/2006.
2. ☒ The allowed claim(s) is/are 1-13.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

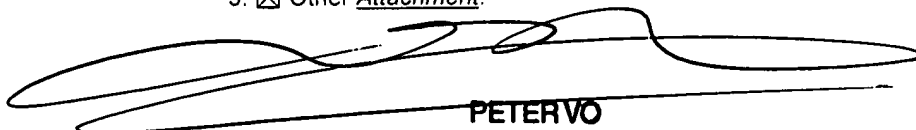
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other Attachment.



PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

EXAMINER'S AMENDMENT

1. The amendments received on 3/13/2006 and 2/17/2006 have been fully considered and made of record.
2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given on 03/29/2006 in a follow-up to a telephone interview with Harry J. Staas on 03/28/2006.

The application has been amended as follows:

Claim 1:

- In line 8, replace "material" with --metal material, different from the material of the base,--
- In line 10, insert -- completely -- before "filling the"
- In line 10, replace "material" with --metal material different from said first metal material,--
- In line 12, replace "material" after "a third" with --metal material, different from said second metal material,--
- In line 20, insert --, thereby producing the wiring substrate -- after "of the bumps"

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For clarity, the claims (as amended by the examiner) have been included as an attachment.

1. The following is an examiner's statement of reasons for allowance: the prior art does not teach, in combination with all other claim limitations, a method for producing a wiring substrate provided with bumps protruding from a surface of the substrate, the method comprising the steps of: covering one side of a metallic base with an electrical insulating film and forming open holes in the insulating film so as to expose at the bottoms thereof the base, etching the base using the insulating film having the open holes formed as a mask to form concavities in the base, electroplating the interior face of each of the concavities with a first metal using the base as a plating power supply layer to form a barrier metal film on the interior face of each concavities, completely filling the concavities with a second metal material by electroplating, forming a barrier layer on the surface of the second metal by plating with a third metal, forming a stack of a predetermined number of wiring patterns on the insulating film, the wiring patterns being electrically connected to the second metal, removing the base from the stack of wiring patterns having bumps each having the barrier metal film, and removing the barrier metal film from each of the bumps. It should be noted that the admitted prior art together with the references cited by the examiner teach many the claim limitations individually (such as masking, etching to form concavities, electroplating, forming wiring patterns). However, no prior art references have been found which teach all of the steps

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in the particular order claimed by the applicants, and, taken together, the limitations of claim 1 are not obvious over nor anticipated by the prior art.

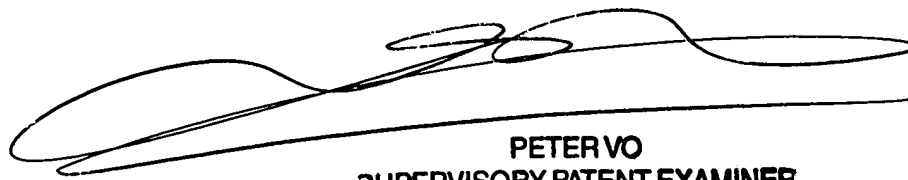
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Livius R. Cazan whose telephone number is (571) 272-8032. The examiner can normally be reached on 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on (571)272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LRC 03/29/2006



PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

Attachment

Claim 1:

A method for producing a wiring substrate provided with bumps protruding from a surface of the substrate, the method comprising:

covering one side of a metallic base with an electrical insulating film and forming open holes in the insulating film so as to expose, at the bottoms thereof, the base;

etching the base using the insulating film, having the open holes formed therein as a mask, to form concavities in the base;

electroplating the interior face of each of the concavities, using the base as a plating power supply layer, with a first ~~material~~ metal material, different from the material of the base, to form a barrier metal film on the interior face of each of the concavities;

completely filling the concavities with a second, bump ~~material~~ metal material different from said first metal material, by electroplating, using the base as a plating power supply layer;

forming a barrier layer of a third ~~material~~ metal material, different from said second metal material, on the surface of the bump material in each concavity, using the base as a plating power supply layer;

forming a stack of a predetermined number of wiring patterns on the insulating film, the adjacent wiring patterns in the stack being separated from each other by an intervening insulating layer and being electrically connected to each other through vias formed in the intervening insulating layer and to the bump material in the concavities; and

removing the base from the stack of wiring patterns having bumps, each bump having the barrier metal film thereon, and removing the barrier metal film from each of the bumps, thereby producing the wiring substrate.

Claims 2-13 are identical to claims 2-13 of the amendment received on 3/13/2006.